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NATIONAL WEATHER SERVICE
U.S. DEPARTMENT OF COMMERCE

—2010—

THE OFFICIAL TEXAS HURRICANE

RIO GRANDE VALLEY EDITION

ALEX
BONNIE
COLIN
DANIELLE
EARL
FIONA
GASTON
HERMINE
IGOR
JULIA
KARL
LISA
MATTHEW
NICOLE
OTTO
PAULA
RICHARD
SHARY
TOMAS
VIRGINIE
WALTER

SURVIVAL GUIDE

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Introduction

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Front Cover Design By:
Cynthia Ostrowski

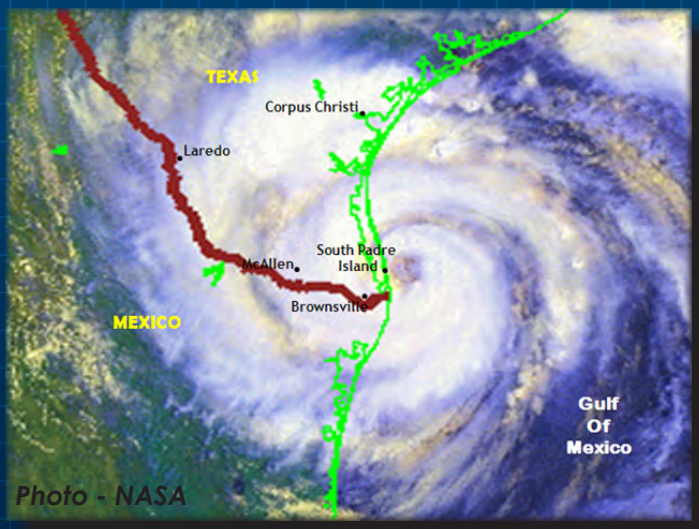
During the 2008 hurricane season, Texans experienced the devastating impacts of two hurricanes, Dolly and Ike, across our coastal communities. We are grateful for the compassion, courage, and generosity of our citizens, volunteers and first responders who stood ready and acted to help their neighbors in need. Their good hearts reflect the character of Texans.

The 2009 Atlantic hurricane season was below average in activity, with a total of nine named storms and three hurricanes. Fortunately, for the first time since 2006, no storm brought hurricane force winds to the United States. The lack of activity was due in part to the appearance of El Niño during the past summer, causing strong wind shear which inhibited the development of storms.

Each year, Texans living in coastal areas face the threat of hurricanes. The 2010 hurricane season presents another opportunity to raise awareness of the steps that can be taken to help protect our citizens and our communities. Hurricanes can be devastatingly powerful with impacts from storm surge, high winds, tornadoes, and flooding. To reduce the potentially deadly effects of these storms, it is imperative for people in hurricane-prone areas to prepare for each type of hurricane hazard. Taking the time to develop a family disaster plan, reviewing emergency preparations and checklists, creating a disaster supply kit, and staying aware of current weather situations will improve our level of preparedness and help save lives. For these reasons, your Texas Division of Emergency Management, along with your local National Weather Service and several key private, not-for-profit, media and government partners developed this comprehensive Hurricane Guide for our coastal citizens and communities.

This collaborative Hurricane Guide can serve as your roadmap for action before and during a hurricane and also act as an instructional guide for recovery, continuity and resiliency after the storm passes. We are asking you today to make a pledge and commitment to make hurricane preparation of the utmost importance to you. Planning is everyone's responsibility. It is important to plan accordingly to meet your personal, family and business needs. In this manner, we are all working together for safer and better prepared communities across the Lone Star State. Working together, we can safeguard lives and protect property by taking the appropriate measures and precautions outlined in this Hurricane Guide.

About the Hurricane



High resolution satellite image of Hurricane Dolly prior to landfall on South Padre Island.

Hurricanes form over warm ocean waters, like those found in the Gulf of Mexico. The hurricane season starts June 1 and ends November 30. The peak threat for the Texas coast exists from August through September. However, hurricanes can and have struck the Texas coast during every month of the hurricane season.

Since 1851, 63 hurricanes have struck the Texas coast. That is one every three years on average.

Historical perspective of hurricane landfalls in Texas since 1851.

Definitions to Know

TROPICAL DEPRESSION: An organized system of persistent clouds and thunderstorms with a closed low-level circulation and maximum winds of 38 mph or less.

TROPICAL STORM: An organized system of strong thunderstorms with a well defined circulation and maximum sustained winds of 39 to 73 mph.

HURRICANE: An intense tropical weather system with a well defined circulation and sustained winds of 74 mph or higher.

TROPICAL CYCLONE: A general term used to describe a tropical depression, tropical storm, or hurricane.

HURRICANE/TROPICAL STORM WATCH: Hurricane or Tropical Storm conditions are possible in the watch area within 48 hours.

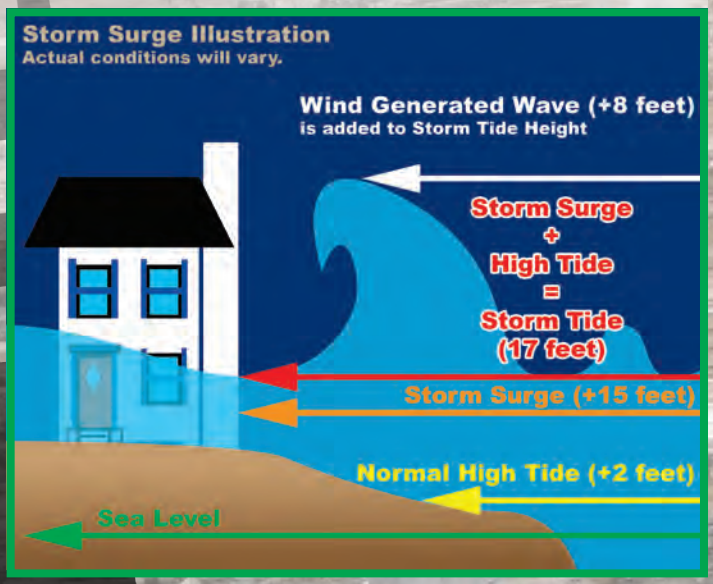
HURRICANE/TROPICAL STORM WARNING: Hurricane or Tropical Storm conditions are possible in the warning area within 36 hours.

Storm Surge

Storm surge is a large dome of water, 50 to 100 miles wide that sweeps across the coastline along and to the right of where the eye makes landfall. The stronger the hurricane winds, the higher the storm surge. The storm surge can be more than 15 feet in major hurricanes. Storm surge poses the greatest threat to life and property for coastal communities.

Graphics-Gordon Wells from the Center for Space Research and Mike Peacock (retired) from the Texas Division of Emergency Management.

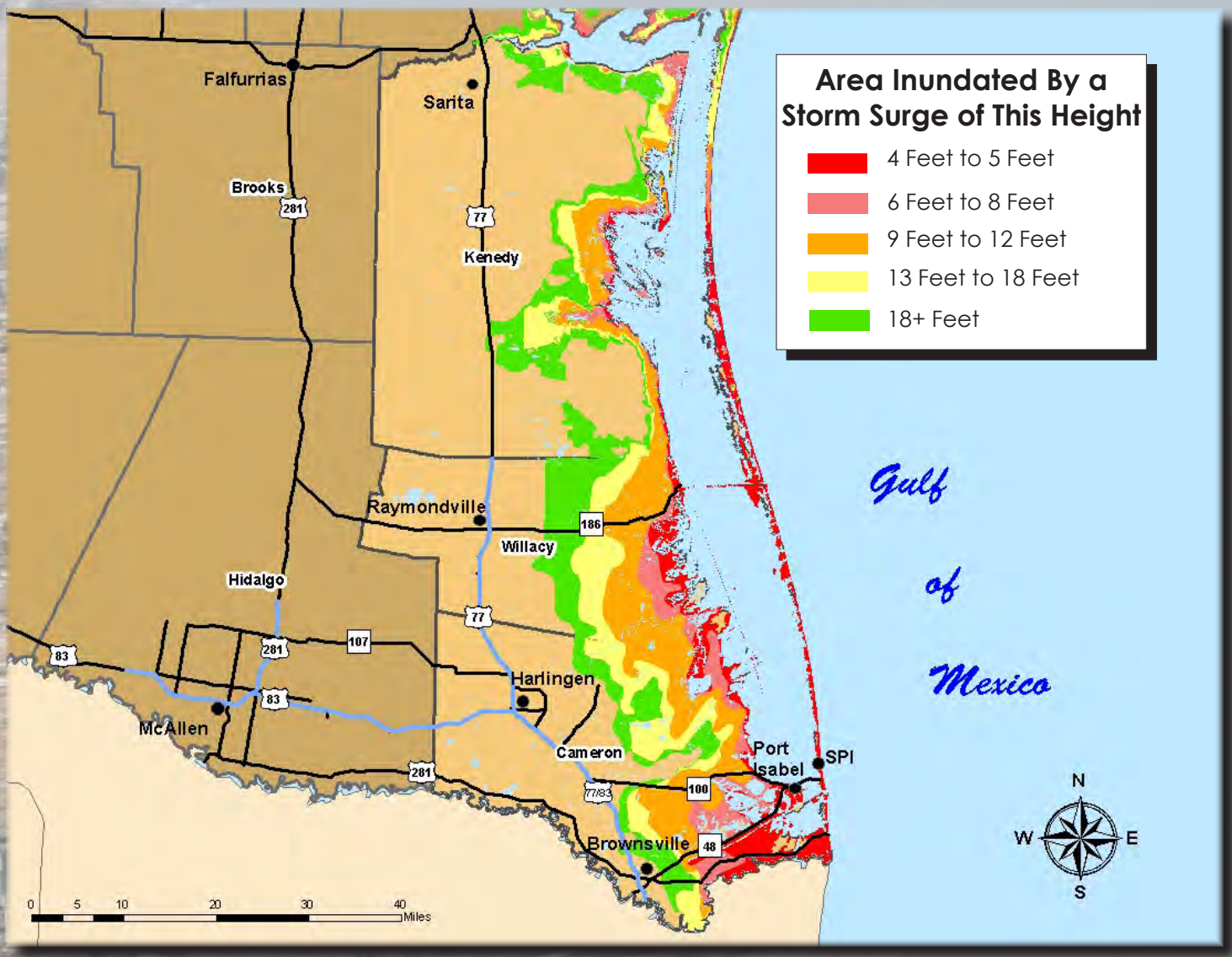
Computer simulations of a major hurricane landfall clearly show the huge impact a storm surge could have on a low lying coastal community. Communities such as the Town of South Padre Island (pictured to the left) would be completely submerged if a major hurricane made a direct hit.



Storm surge from a major hurricane has the potential to submerge and destroy most of the coastal properties in South Padre Island, Port Isabel, and Laguna Vista. Evacuating well inland before a major storm strikes can save your life.

Storm Surge

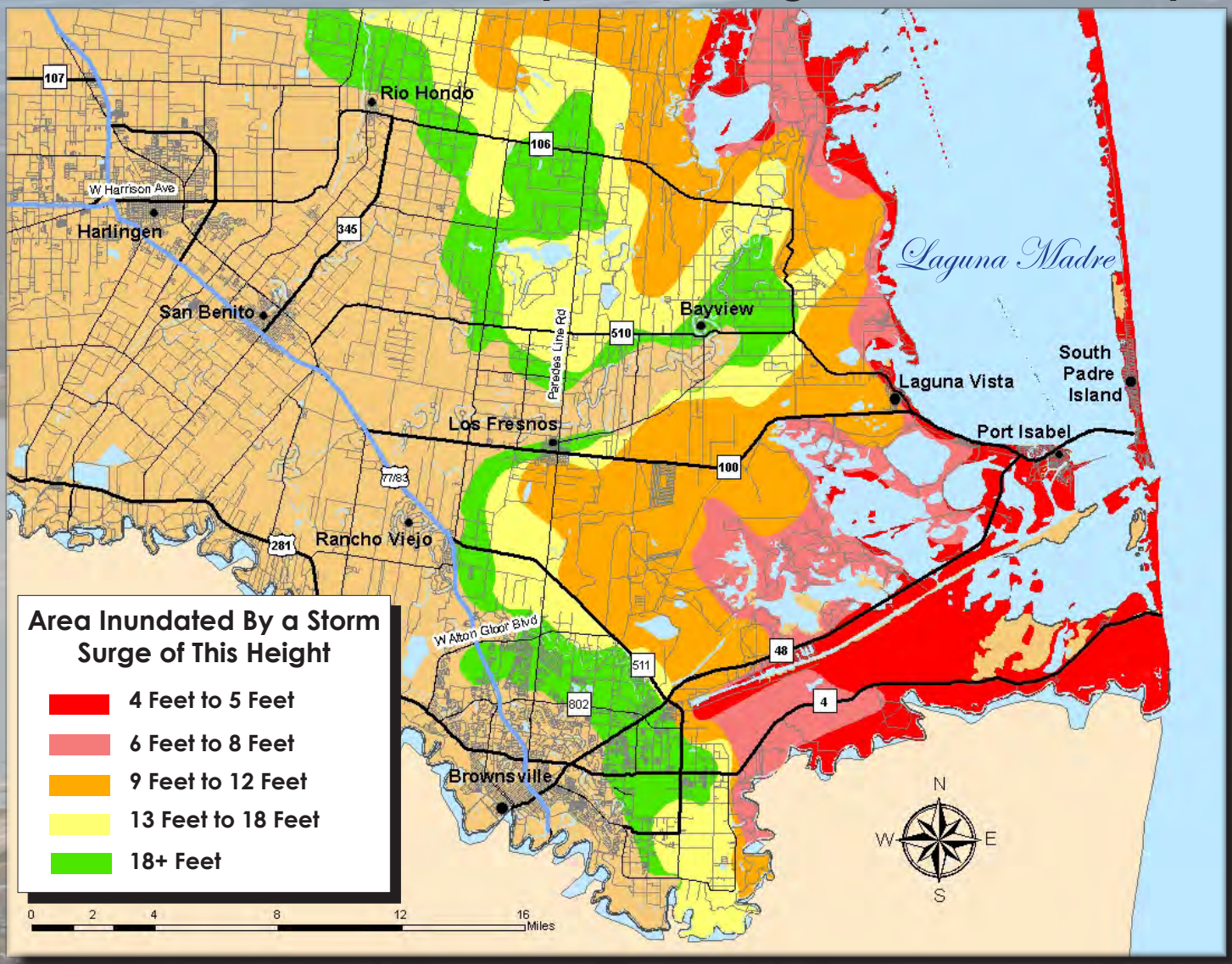
Deep South Texas Storm Surge Inundation Map



This map indicates the potential inundation area by a storm surge of the listed height. To determine water depth you must subtract your elevation. Accuracy is +/- 20%.

Inundation Maps

Coastal Cameron County Storm Surge Inundation Map



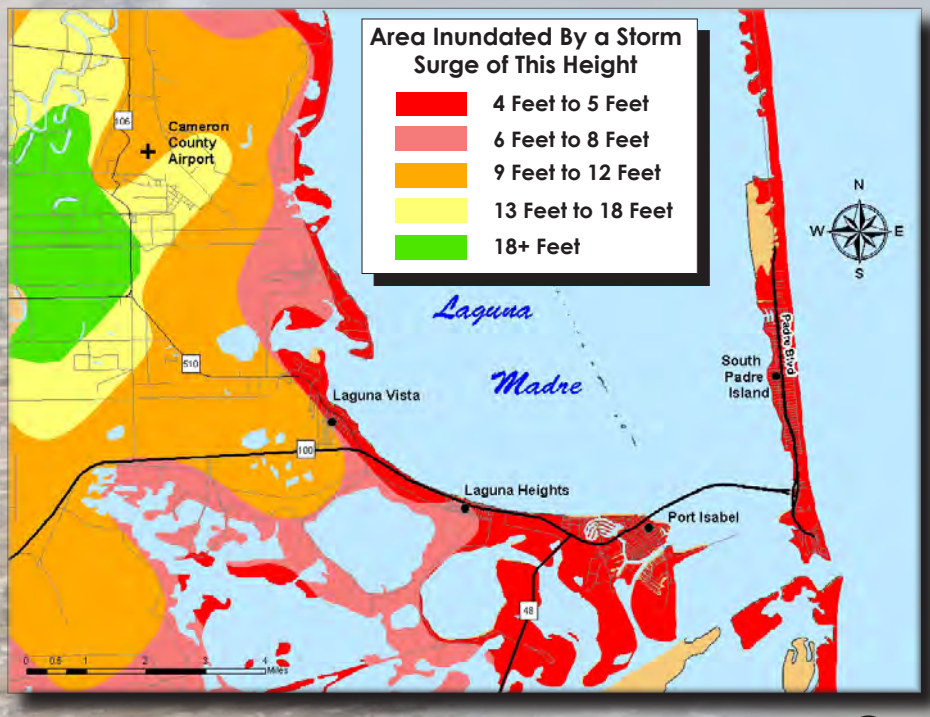
This map indicates the potential inundation area by a storm surge of the listed height. To determine water depth you must subtract your elevation. Accuracy is +/- 20%.

Want to see more high resolution storm surge maps? Go To:

weather.gov/rgv

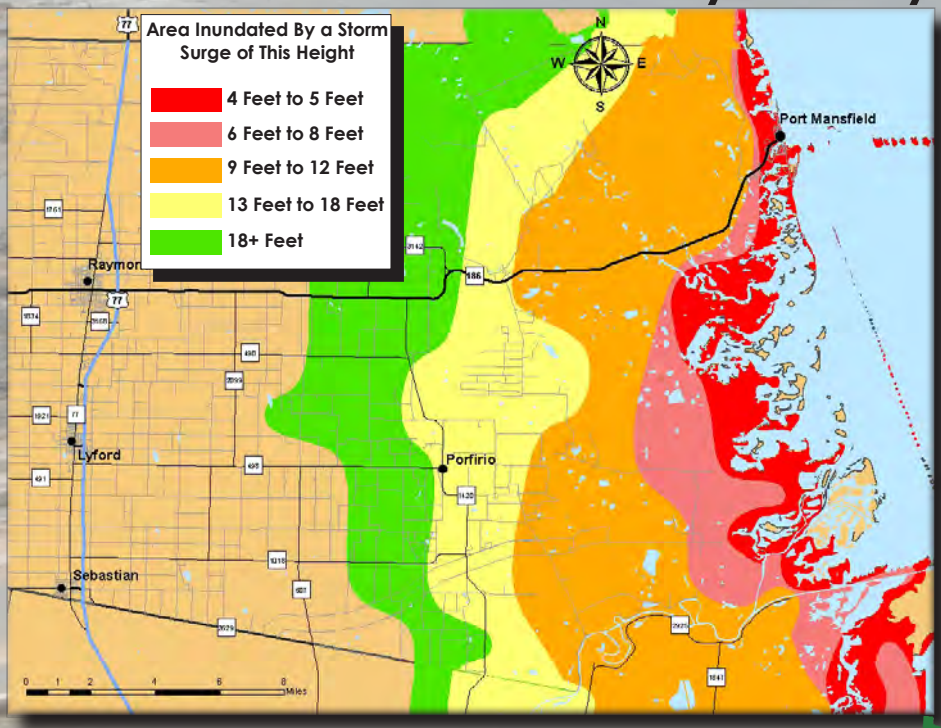
Inundation Maps

Port Isabel/South Padre Island



These maps show the potential inundation area by a storm surge of the listed height. Colors in the reds and oranges indicate the highest danger. To determine water depth you must subtract your elevation. All of these maps have an accuracy of +/- 20 percent.

Coastal Willacy County



"The greatest potential for loss of life related to a hurricane is from the storm surge."

- National Hurricane Center

Flooding and Tornadoes

These homes are completely submerged under several feet of water as a result of inland freshwater flooding.

Inland Flooding

Inland freshwater flooding from tropical cyclones is a major threat to people well inland from the coast. Very slow moving tropical storms and hurricanes can produce tremendous rains of 20 to 30 inches or more in a very short amount of time, resulting in disastrous flooding.

Tornadoes

Tropical cyclones also produce tornadoes. These tornadoes most often occur in thunderstorms embedded in rain bands well away from the center of the hurricane; however, they can also occur near the eyewall. Tornadoes produced by tropical cyclones are relatively weak and short-lived, but still pose a threat.

The remnants of Tropical Storm Amelia (August 1978) produced excessive rainfall in the Hill Country with 3-day maximum rainfall amounts around 48 inches at Medina. There were 27 fatalities in the disasterous flash flooding along the Medina and Guadalupe Rivers.

Hurricane Carla produced 26 tornadoes across southeast Texas in September 1961. An F4 tornado struck Galveston killing 8 and injuring 55 while destroying 120 buildings. It remains the deadliest tornado associated with a hurricane.

Destructive Winds

This large piece of plywood was driven through the trunk of a palm tree during the fierce winds of Hurricane Andrew in south Florida in 1992.

Hurricane force winds of 74 mph or more can destroy buildings, mobile homes, trees and power poles. Debris such as signs, roofing material, siding, and small items left outside become flying missiles in a hurricane. The strongest winds occur in a region of the hurricane called the eyewall. Wind gusts in the right side of the eyewall are the most destructive. Hurricane force winds can be felt as far as 150 miles from the coast.

It is imperative to ensure your home or business is well constructed to minimize the damage from the wind. See Page 10 in this guide for cost effective home improvement tips that can help you reduce your damage from a hurricane.

MOBILE HOME RESIDENTS MUST EVACUATE!

- No mobile home or manufactured home - no matter how new it is - can provide safe shelter from hurricane force winds.
- Straps or other tie-downs ***will not*** protect a mobile home from the high winds associated with a hurricane.
- Mobile home residents ***must evacuate*** when told to do so by local authorities.

Saffir Simpson Hurricane Wind Scale

- Category 1 Winds 74 to 95 mph
- Category 2 Winds 96 to 110 mph
- Category 3 Winds 111 to 130 mph
- Category 4 Winds 131 to 155 mph
- Category 5 Winds greater than 155 mph

Planning and Preparing

Preparing Your Home Before the Storm

Proper hurricane preparations made ahead of time will not completely protect your property from damage. However, following a few simple tips may greatly reduce the damage to your home and property.

Hurricane clips attaching roof trusses to side walls and enhanced cross bracing on garage door.

Important Home Preparation Tips

Elevation Matters

- Know the elevation of your home! Are you in a flood and/or evacuation zone?

Mobile Homes

- Check tie-downs for rust or breakage.
- Residents of mobile homes *must evacuate* when told to do so!!

Landscaping

- Trim trees, shrubbery and dead limbs, especially ones close to your home.
- Repair or replace broken or damaged fences.
- Shredded bark is preferred instead of small gravel or stone bedding.

Roofing

- Inspect the roof for loose tiles, shingles or debris. Consider replacing old or damaged shingles with new ones rated for hurricane force winds.
- Check for and/or install hurricane clips to secure roof trusses to side walls.
- Clear loose and clogged rain gutters and downspouts.

Doors

- Reinforce garage doors and tracks or replace with a hurricane tested door. (See above image)
- Reinforce double entry doors with heavy duty foot and head bolts.
- Use a security dead bolt with a one inch minimum bolt length.
- Doors may be shuttered, but one entry must be left easily accessible.

Windows

- If possible, install tested/manufactured hurricane shutters.
- Inspect existing shutters to ensure they are in good working order.
- Alternative: Use 5/8" or greater exterior grade plywood secured by 2 1/2" screws and/or special clips. Obtain wood and fasteners, cut wood to size, pre-drill holes and place anchors on homes.
- Store shutters or plywood lying flat to avoid warping when not in use.

Planning and Preparing

Business and Employee Preparation

- Establish a temporary location for business operations in case your facility is damaged.
- Give employees enough time to secure their homes and families.
- Consider paying employees before they leave to prepare their homes.

Tips for Businesses

- Identify and protect vital records. Backup and store key files off site.
- Protect electronic equipment from possible water damage.
- Have extra cash and blank checks in case extra money is needed after the storm.
- Identify a safe room for employees who must remain in the building.
- Develop a 24-hour emergency contact with phone numbers of key employees.
- Set up telephone numbers for employees to check in and receive company information.

Protecting Your Boat - Marine Preparations

Tips for Boat Owners

- Check your marina contract for policies and procedures for hurricanes.
- Check with the manufacturer for proper ways to secure your boat during a storm.
- Consider moving arrangements well in advance of an approaching storm.
- Trailer boats should be removed from the water and securely stored at least 48 hours before a hurricane is expected to make landfall.
- Purchase necessary hurricane materials such as additional mooring lines, crew anchors, fenders, fender boards, chafing gear, and anchors.
- Safe storm moorings should consist of good condition ropes of sufficient diameter and length, with at least three or four substantial anchor points.
- Do not moor parallel to bank. Receding tides often each or capsize boats in this type of anchorage.

Special Needs and Pets

General Preparations for People With Special Needs


FEMA News Photo

Preparation in advance of hurricane season is essential, especially for people with special needs. It is essential that a destination is identified ahead of time that can accommodate people with special needs. Shelters should be considered as a **last resort** when people with special needs evacuate because many shelters cannot provide the attention required. Assisting elderly neighbors and acquaintances with pre-hurricane preparations is encouraged.

Important Special Needs Tips

- Identify with whom you will stay in the event an evacuation becomes necessary.
- Make arrangements for transportation in the event you evacuate. Make sure your transportation can accommodate any equipment or other supplies that need to be taken with you.
- Make sure you have the following items that should be stored in advance:
  - ✓ *Extra copies of your prescriptions in case your physician's office is damaged and not operational.*
  - ✓ *At least a 1 month supply of medications.*
  - ✓ *Identification.*

Preparing for Your Pet's Safety

211 TEXAS
Connecting People and Services

Your pet should be part of your overall hurricane preparation plans. Below are a few important things to help you prepare:

- Make sure your pet's vaccinations are current and have proof they are current. **DO NOT** assume that a public shelter or hotel will accept your pet.
- Be sure to have a current photo of your pet.
- Each animal should have a properly sized pet carrier. The carrier should be large enough for the animal to stand up and turn around.
- Make sure your pet has a proper ID collar.
- Pack enough food and bottled water for the duration of your evacuation. **DO NOT** let your pet eat food or drink water from outside that may have become contaminated.
- Be sure to pack all medications your pet may need along with a muzzle, collar, leash, paper towels, and trash bags.

Contact Info/Supply Kit

The South Texas Chapter of the American Red Cross recommends that you have the following items in your Hurricane Supply Kit. Do not forget to have a family meeting before hurricane season and review your communication information and evacuation plan. Make sure the contact information such as home, work, school, cell phone numbers, and your "Out of Town" contact person's information is current.

American Red Cross
southtexasredcross.org

Emergency Contact Information

Out of Town Contact Address:
Out of Town Contact Phone Number:
Work Telephone Number:
Cell Number/Spouse Cell Number:
Children Cell Number:
School Telephone Number:
Doctor Telephone Number:
Bank/Credit Card Telephone Number:
Insurance Company Information:

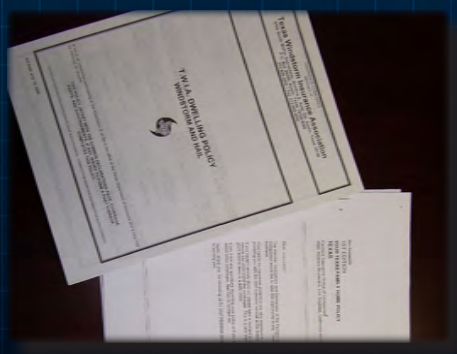
Hurricane Supply Kit

- At least a 7-day supply of non-perishable food and a manual can opener
- At least a 7-day supply of water. One gallon per person per day is recommended
- Battery powered portable television or radio with extra batteries
- Flashlight with extra batteries
- First Aid kit and manual
- Sanitation and hygiene items such as instant hand sanitizing gel, moist towelettes, toilet paper, and feminine hygiene products
- Matches in a waterproof container
- Whistle
- Kitchen accessories and cooking utensils
- Cash
- Extra clothing, blankets, and sleeping bags
- Photocopies of identification, insurance, prescriptions, household inventory, credit cards, and your latest utility bill
- CD or photocopies of important documents such as birth/marriage certificates and titles
- Prescription medications, eyeglasses, contact lens solution, and hearing aid batteries
- Formula, baby food, diapers, and pacifiers
- Pet carriers, leashes, shot records, and food for each animal evacuating with you
- A good map showing county roads and highways
- Tire repair kit, booster cables, pump, and flares
- White distress flag
- Toys and games for children
- List of family phone numbers and addresses outside the area

Insurance Tips

Insurance Tips - Before the Storm

- When shopping for insurance, get quotes from different companies and consider financial strength and history of complaints from each company.
- Ask agents for discounts if available.
- New and existing policies **will not be written or modified** when a storm nears the Gulf of Mexico.
- Make sure you fully understand what perils are covered and excluded in your policy.
- Make sure your coverage is adequate to replace your home and contents in today's dollar.
- Determine whether your policy covers additional living expenses for a temporary residence if you are unable to live in your home because of damage from a disaster.
- **DO NOT** cancel an old policy until you have a new policy in effect.
- Before hurricane season, prepare detailed written and/or photographic inventory of your home's contents and store it in a safe place with your policy.
- If you evacuate or choose to leave your home for safety, make sure to take the written and photo inventory with you, as well as all insurance policies (auto, home, life, etc.)
- If your insurance company does not cover flood or windstorm perils, ask about coverage through the Texas Windstorm Insurance Association or the National Flood Insurance Program.



Important Web Information

National Flood Insurance Program
www.floodsmart.gov
Texas Windstorm Insurance Association
www.twia.org
Texas Department of Insurance
www.tdi.state.tx.us/consumer
1-800-252-3539 (Consumer Help Line)

Insurance Tips - After the Storm

- Give prompt written notice to your insurance company.
- If you cannot be easily contacted, give your insurance company the contact information of a trusted friend or relative who can reach you if necessary.
- Photograph or videotape damaged structures and all maged property. Make a list of damaged or lost items.
- **DO NOT** throw out damaged property before your adjuster has inspected the debris unless it is a health hazard or impedes local cleanup.
- Protect your property from further damage.
- Keep an accurate record of temporary repair and living expenses if a loss of use is suffered.
- Along with insurance adjuster estimate for repairs to home, obtain two or more contractor estimates. Estimates must be broken down per line item.
- Payment advancements are made to policy holder for home repairs, personal property and living expenses. Final payments are made only after completed repairs and adjuster review.

The P-3 Hurricane Hunter

Specially equipped NOAA aircraft play an integral role in hurricane forecasting. Data collected during hurricanes by these high-flying meteorological stations are fed into numerical computer models to help forecasters predict hurricane track and intensity. These computer models also help hurricane researchers achieve a better understanding of storm processes, thereby improving their forecast models.

When a hurricane threatens the U.S. or islands around the Caribbean Sea, men and women of the U.S. Air Force reserve and the National Oceanic and Atmospheric Administration (NOAA) begin flying into the storm. Research scientists from colleges, universities, and other organizations sometimes join them, especially on NOAA flights. NOAA's two P-3 turboprops probe the hurricane about a half dozen times during the course of a grueling ten-hour mission. Scientists aboard the aircraft deploy instruments called GPS (Global Positioning System) dropwindsondes as the P-3 flies through the hurricane. These devices continuously radio back measurements of pressure, humidity, temperature, wind direction and wind speed as they fall toward the sea, providing a detailed look at the structure of the storm and its intensity.

In addition to flying hurricane research and reconnaissance missions, NOAA's P-3s participate in a wide variety of national and international meteorological and oceanographic research programs each year. Recently, these aircraft have been used in major studies on storms approaching the continents of Europe and North America to improve forecasts and study the effects of El Niño, atmospheric gases and aerosols over the North Atlantic, large-scale convective severe storm complexes in the Midwest, and winter storms battering U.S. Pacific coastal states.

The Official Texas

Hurricane Tracking C

2010 Hurricane Names

- ☐ Alex
- ☐ Bonnie
- ☐ Colin
- ☐ Danielle
- ☐ Earl
- ☐ Fiona
- ☐ Gaston
- ☐ Hermine
- ☐ Igor
- ☐ Julia
- ☐ Karl
- ☐ Lisa
- ☐ Matthew
- ☐ Nicole
- ☐ Otto
- ☐ Paula
- ☐ Richard
- ☐ Shary
- ☐ Tomas
- ☐ Virginie
- ☐ Walter

This chart is marked with vertical (longitude) and horizontal (latitude) lines, each representing 1 degree. A storm's position is given in these degre

Chart

es. Find the given longitudinal number at the bottom of the chart. Follow it up where it intersects with the given latitudinal line. Place a mark on the intersection point (this is the hurricane's current position).

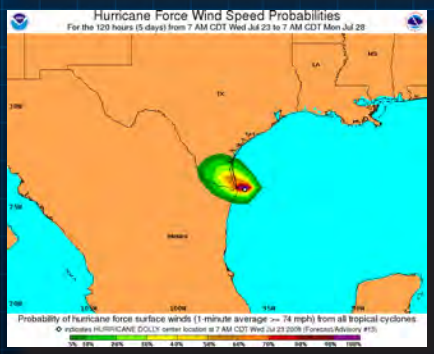
Hurricane Forecasts

The National Hurricane Center (NHC) in Miami, FL is the official source for tropical cyclone advisories and forecasts and is responsible for issuing tropical cyclone watches and warnings for the United States.

Weather Information
National Hurricane Center
www.hurricanes.gov

Forecast Track and Uncertainty Cone

- Most recent position for a storm along with all coastline watches and warnings. Includes a 3 or 5 day track with error cone.
- Error cone represents a 5 year average error. Storms only stay within the error cone 67% of the time.
- DO NOT focus too closely on the exact track forecast - the little black line.



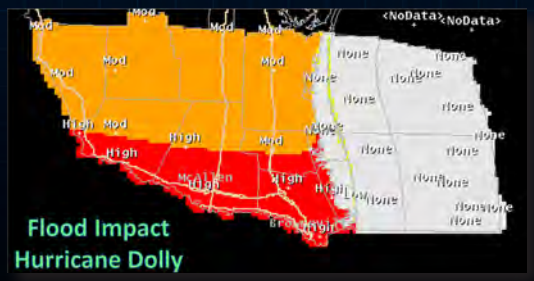
Hurricane Force Wind Probability Graphic

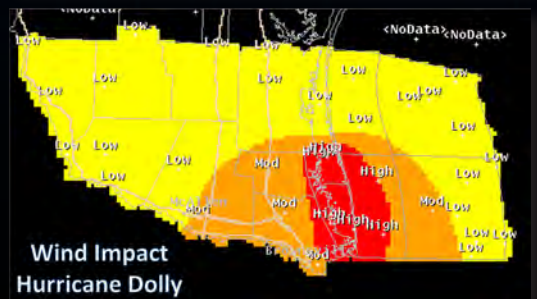
- These charts indicate the chance, in percent, that 74 mph or higher winds will occur at any point on the map within the time period stated.

Remember that hurricane conditions can be felt hundreds of miles away from the center of the storm. DO NOT wait for a hurricane watch or warning before beginning your initial preparations, as it may be too late to complete them.

Information for the Lower Rio Grande Valley

Your National Weather Service in Brownsville provides impact information specific to communities near the U.S./Mexico border. The Hurricane Local Statement provides text detailing the threat for wind, storm surge, flooding, and tornadoes. Need a quick glance? Check out our graphical hazards page on the web. At right are maps showing potential impact levels from inland flooding and wind.





Find Much More At:

weather.gov/rgv

NWS 24-Hour Phone Recording: 956-546-5378

Final Checklists

Actions to Take When a Storm is in the Gulf

- Listen frequently to radio, TV, or NOAA weather radio for bulletins and forecasts of the storm's progress.
- Double check items in your emergency supply kit.
- Fuel and service your vehicles.
- Inspect and secure mobile home tie-downs.
- Make sure you have supplies to survive on your own for at least one week if you plan on staying.
- Board up windows (if shutters do not exist) in case storm moves quickly and you have to leave. **TAPE PROVIDES NO PROTECTION!**
- Store lawn furniture and other loose, light weight objects, such as garbage cans and garden tools.
- Get plenty of extra cash in case power goes out and ATMs do not work.
- Garage or store vehicles that are not being used.
- Follow instructions issued by local officials. **EVACUATE IMMEDIATELY IF ORDERED TO DO SO!**

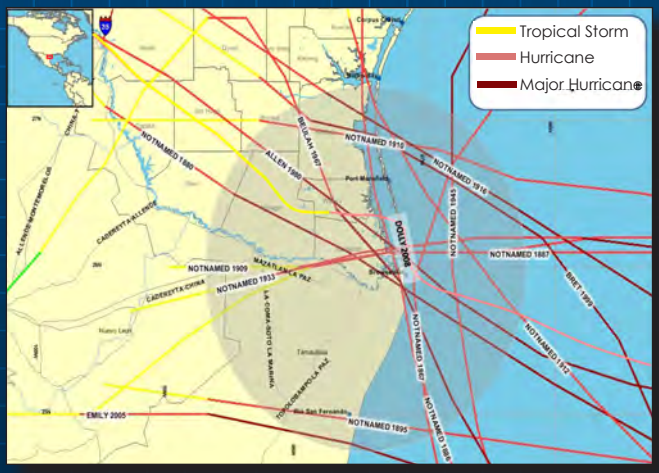
Final Actions to Take if Leaving

- Turn off propane tanks.
- Unplug small appliances.
- Empty refrigerator and freezer.
- Turn off utilities if ordered to do so.
- Notify family members of your evacuation plans.
- Lower water level in swimming pool by one foot.
- Lock home securely.
- Board up remaining doors and brace garage door.
- Take pets with you.

Final Actions to Take if Staying

- Close storm shutters.
- Turn refrigerator or freezer to coldest setting and open only if necessary. (25 pounds of dry ice will keep a 10-cubic foot freezer below freezing for 3-4 days.)
- Follow instructions from emergency managers and be prepared to turn off utilities if ordered to do so.
- Board up remaining doors, brace garage door, and remain inside. Stay away from boarded up windows.
- Take refuge in a predetermined safe room, such as an interior closet, bathroom, or hallway.
- Beware of the calm winds in the eye of the storm and do not venture outside. Some of the strongest winds may occur shortly after the eye passes.
- **DO NOT EXPECT EMERGENCY RESPONDERS TO BE OF ANY ASSISTANCE WHEN THE MOST DANGEROUS CONDITIONS ARE OCCURRING!**

Deep South Texas Hurricane History



Map showing the tracks of tropical storms and hurricanes to affect Deep South Texas since 1851.

Since 1851, 63 hurricanes have impacted the Texas coast; only twelve as major hurricanes. Major hurricanes have winds of 110 mph or greater and are rated category 3, 4, or 5 on the Saffir-Simpson scale. No hurricane has made landfall in Texas at category 5 strength. Storms of note occurred in the following years:

1886: Indianola II Flooded Brownsville
1933: Unnamed Devastated Brownsville
1954: Alice Rio Grande Flooding
1967: Beulah (See Below)
1980: Allen Severe winds in Port Mansfield
1999: Bret King Ranch landfall
2005: Emily Tropical Storm effects
2008: Dolly (See Next Page)

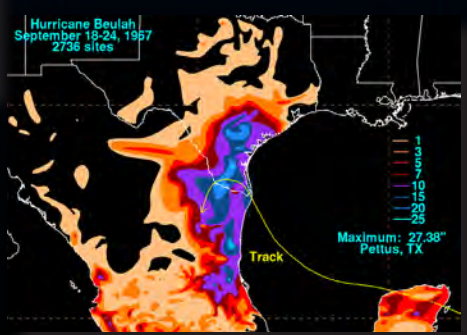
Hurricane Beulah (1967)

Much larger and stronger than Dolly, Hurricane Beulah made landfall just south of Brownsville in September of 1967, then moved northwest through Willacy, Brooks, and Duval Counties before meandering southwest through Zapata County. Beulah brought damaging winds greater than 130 mph and a storm tide of 5 to 8 feet across South Padre Island and communities along the Laguna Madre. Hurricane-force winds were recorded for eight hours at Brownsville, with a peak wind of 109 mph before the anemometer fell. 100 mph gusts were felt as far inland as Pharr, Weslaco, and Edinburg (Hidalgo County).

Beulah continued to wreak havoc while moving inland. The storm spawned at least 117 tornadoes in South Texas, but only one in the Rio Grande Valley. Beulah's slow movement resulted in more than 20 inches of rain from Starr to Brooks County. Flooding devastated Falfurrias after more than 22 inches of rain pushed area creeks over their banks. Nearly every community in Deep South Texas had some type of flooding. Excessive water flowing down the Rio Grande and adjacent waterways inundated a number of cities and towns. Several feet of water from the Arroyo Colorado destroyed homes and businesses in Harlingen. High standing water flooded McAllen, Edinburg, and Raymondville. At least 15 people perished in Texas. Statewide damages were estimated at $170 million, with at least $100 million in Deep South Texas. This would equate to more than $4 billion today, accounting for inflation and population increases.

Flooding in Harlingen, TX from Hurricane Beulah.

Home destroyed in South Padre Island, TX from Hurricane Beulah.



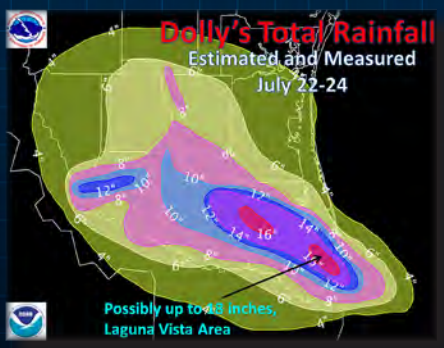
Right: *Track and rainfall amounts from Hurricane Beulah.*

Hurricane Dolly

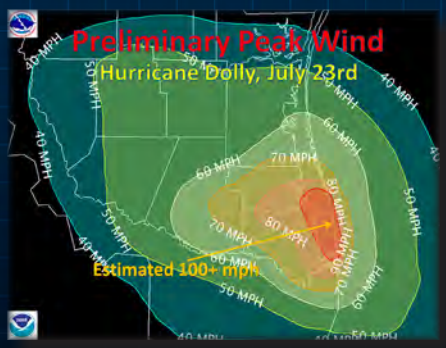
In 2008 Hurricane Dolly became the storm of memory for many residents of the Lower Texas Coast and Rio Grande Valley. Dolly made landfall along the Cameron/Willacy County line, spreading strong winds, heavy rain, and a trail of damage across the region. Winds of tropical storm to hurricane strength resulted in widespread power outages. Rainfall amounts of 16 to at least 18 inches contributed to widespread flooding, extending from southwestern Willacy County to northern and eastern Cameron County, from Santa Rosa through Harlingen, San Benito, Los Fresnos, and Laguna Vista. Sustained winds within the eye wall prior to and at landfall were estimated to be around 80 mph, with gusts just over 100 mph.

Flooding in Harlingen, TX caused by Hurricane Dolly.

The most significant wind damage extended from the Town of South Padre Island to Port Isabel. Sustained winds near 80 mph with frequent gusts to 95 mph blew off roofs, blew out windows, tore holes into the sides of several buildings, and knocked down dozens of power poles. The most severe damage occurred at older mid and high rise buildings, and to warehouse-style construction fully exposed to the winds. Dolly's intensity was concentrated within the south and west eyewall; hurricane force winds along the lower Texas coast came largely from the west and southwest.



Estimated and measured rainfall from Hurricane Dolly.



Estimated and measured peak wind speed from Hurricane Dolly.

Damage to the Cameron County Airport near Bayview, TX

As Dolly approached from the south, a storm surge of 3 to 4 feet affected the Town of South Padre Island, Port Isabel, and Port Mansfield. When the hurricane made landfall north of the Town of South Padre Island, notable inundation occurred from the *bay side*, when strong westerly winds churned up the normally quiet waters of the Laguna Madre, slamming waves up to 4 feet high into structures along and near Laguna Boulevard. These waters then flowed east across Padre Boulevard and eventually reached Gulf Boulevard. The sharp change in wind direction from northeast to west largely spared the resort's beaches from devastating erosion. September's Gustav and Ike (page 22) would finish the job that Dolly began.

Damaging winds continued inland across Harlingen, Raymondville, and McAllen. Gusts to hurricane force extended from Los Fresnos through San Benito, Harlingen, and Raymondville. These winds lifted roofs, collapsed walls of older buildings, and knocked down thousands of trees and limbs. Gusts from 50 to 70 mph across highly populated portions of Hidalgo County caused additional minor damage. Widespread power outages left nearly a quarter million customers in the dark during the storm; in harder hit areas such as Port Isabel and the Town of South Padre Island, power was out for more than a week.

Torrential rains led to widespread flooding especially in low lying areas with poor drainage. Roads were closed and travel was difficult for residents along the Highway 77/83 corridor for several days. Winds and flooding caused substantial damage to agricultural areas, particularly to the cotton crop. Total storm damage was estimated at a little over $1 billion, not including freshwater flooding.

Hurricane Ike

Hurricane Ike evolved from a tropical disturbance that moved off the African coastline during the last week of August 2008. As the disturbance moved into the central Atlantic, a tropical depression formed and quickly strengthened into Tropical Storm Ike. Ike reached hurricane status within 3 days and maintained hurricane strength for the remainder of its 2 week lifespan, marching across the southern Bahamas, across both tips of Cuba, through the central Gulf of Mexico, and into Southeast Texas. Ike grew very large in the Gulf with tropical storm force winds up to 425 miles in diameter. Most critically, Ike's size generated open water waves above 30 feet. The resulting storm surge later flattened much of the Bolivar Peninsula with 15 to 20 feet of water as Ike made landfall on the north end of Galveston Island early on September 13, 2008. Hurricane force winds caused extensive damage across the Houston/Galveston region, and knocked out power to millions of people. Ike was the fourth costliest hurricane to affect the U.S., with an estimated $19.3 billion in damage.

No Picnic on South Padre Island

While most attention was focused on the Upper Texas coast, Ike also stirred up the Gulf along the Lower Texas coast, taking all but the hardiest dunes along the stretch of resort hotels and condominiums that populate the Town of South Padre Island. On the morning of September 12, 2008, extremely rough waves and large swells rolled up and over the dune line. Water levels of at least 5 feet overtopped a few sea walls, producing minor damage and flooding to some beachside structures. High water levels continued through early afternoon. Gulf waves flowed across Padre Boulevard at beach access points north of the resort area, spreading into the Laguna Madre in a few spots.

Beaches flooded along South Padre Island due to Hurricane Ike.

As Ike approached landfall by late evening on the 12th, Gulf waves and swell began to subside. However, the approach of another high tide cycle early on September 13, combined with remaining above normal tides on the Laguna Madre, brought the largest tidal departures on the bay side. A surge of nearly 3 feet produced a peak storm tide around 4 feet. These tides caused minor flooding along portions of Laguna and Padre Boulevard. Water sloshed over bayside docks and well up the sides of stilted structures.

While the Gulf churned, surfers enjoyed a slice of Hawaiian-style heaven. Waves in the protected Isla Blanca jetties built as high as 12 feet in sets appearing in 5 minute intervals.

State Highway 100 flooded by the Gulf north of beach resorts.

High surf at South Padre Island jetties

College Student Preparation

Student Information Checklist

- Assure that all contact information and emergency contact information is accurate with your campus registrar's office.
- If your campus offers an emergency management communication system, register as a user of the system.
- Plan your method of evacuation and your destination before a storm enters the gulf.
- Monitor local radio and TV stations for updates.
- Contact your campus Student Affairs Office if you need assistance with evacuation.
- If you require any assistance due to a disability-related accommodation, contact your campus Disability Services Office to make necessary arrangements.
- Communicate with your family regarding status and location.
- If your campus is evacuating, you will not be allowed to remain on-campus and it is highly recommended that you leave the city. Do not go to a coastal location.
- Take your driver's license, student I.D. card, and a copy of your housing lease as well as medical insurance cards and other important documents when you evacuate.
- If you bank with a local bank or credit union whose infrastructure may be damaged by the storm, withdraw some funds as you may not have access to them once you leave the area.
- International students must take passports with US student visa inside, I-20, I-94, student I.D. and class schedule.
- If using personal transportation, take as many of your valuable or irreplaceable items as you are able.
- If driving, make sure all roads that you are driving are open and safe. You can call the Department of Transportation at 1-800-452-9292 or check on-line for conditions at www.txdot.gov
- Follow baggage limits if participating in an assisted evacuation program.
- Take a 30-day supply of medications in original pharmacy containers.
- Make a record of any valuables left behind (description, serial numbers, etc). Take pictures of all belongings.
- If you are evacuating to a shelter, make appropriate arrangements for pets as most shelters do not accept pets.
- Do not plan to return to campus until an all-clear is given (monitor media and campus web-site).

Preparing Your Room

- ✓ Unplug all electronics and cover them in plastic
- ✓ Shut and lock your window and close your blinds
- ✓ Store items off the floor and away from windows
- ✓ Take all items off balconies and out of yards
- ✓ Follow any additional instructions by your landlord
- ✓ Empty refrigerator
- ✓ Take valuables

Evacuation

Evacuees need to consider the projected path of the hurricane when choosing an evacuation route and destination. Evacuation studies estimate that it would take between 15 and 33 hours to evacuate Cameron County, and up to 8 hours to evacuate Willacy County in advance of tropical storm force winds. Please note that northbound traffic from much of Cameron and Willacy County will not use Highway 77 north of Raymondville, but will be redirected toward Highway 281, a potential contra-flow route, from Hidalgo through Brooks County (page 25, right). This underscores the need for coastal residents to have an evacuation plan. When evacuating, be sure to check local weather and highway conditions before departing. When local authorities order an evacuation of your area, leave immediately!

Evacuation from South Padre Island ahead of Hurricane Dolly.

Texas Road Information

TXDOT Road Conditions
1-800-452-9292 or www.txdot.gov

TXDOT Pharr Office
1-956-702-6100

Emergency Broadcast Information
News Talk 710 KURV-AM
KFRQ FM-94.5
KVLY Mix 107.9 FM
KGBT 98.5 FM (Spanish)

Final Actions before Evacuating

- Follow evacuation orders provided by your local officials. Once the evacuation order has been given, LEAVE IMMEDIATELY!
- Take your Hurricane Supply Kit with you (as described on page 13).
- Leave as early as possible to avoid heavy traffic and hazardous weather.
- See TXDOT map on the next page for an illustration of primary and alternate evacuation routes. Remember that the primary routes often become congested quickly.
- Do not stay in a mobile home near the coast under any circumstance.
- Remember that large boats and travel trailers may not be allowed to cross the Queen Isabella Memorial Bridge between South Padre Island and Port Isabel once high winds commence.
- Prepare to stay at your evacuation destination for a week or more, as re-entry into the affected area may be restricted.

Evacuation

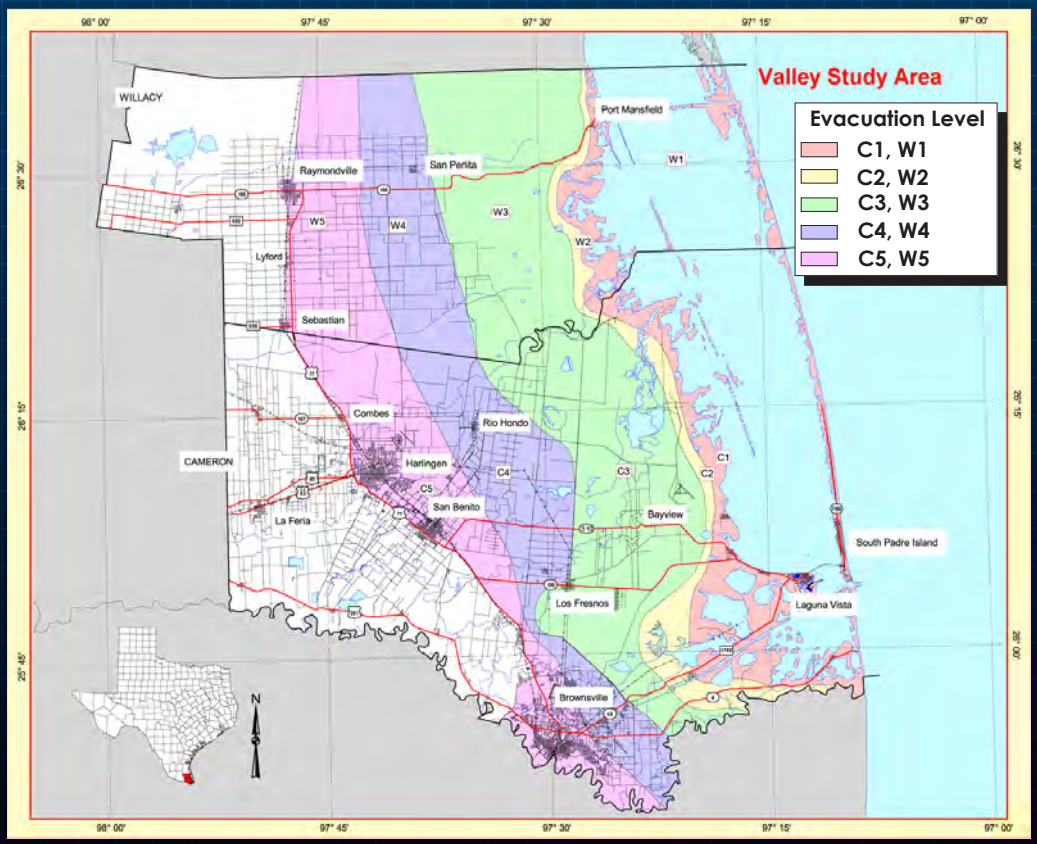
Suggested Evacuation Routes

Evacuation

Evacuation vs. Inundation: Know the Difference!

On Pages 5 through 7 of this guide, inundation maps show how far inland sea water will penetrate from various heights of storm surge. Below, the Valley Study map shows evacuation zones, labeled 1 through 5. For level 5 in Cameron County (C5), evacuations would be required for the majority of the population, including most of Harlingen, San Benito, and Brownsville. These zones, particularly for the most severe hurricanes, differ from the inundation maps in two ways:

* The maps account for the decay of the wind field as a hurricane moves inland, and
* A large number of houses beyond the inundation area will not withstand severe winds.



Valley Study Map showing evacuation zones. Compare this map to the inundation maps on Pages 5 through 7 of this guide.

For example, portions of Los Fresnos and Rio Hondo are outside of the inundation zone, but within zone C4 (purple) of the Valley Study Map. This means for a landfalling Category 4 hurricane, life-threatening consequences are possible from severe winds alone. For Brownsville, San Benito, and Harlingen, a landfalling Category 5 hurricane could result in life-threatening consequences from severe winds alone.

Special Needs Evacuation

Bus Loading Points will open on an as-needed basis. DO NOT go to Bus Loading Points unless directed by public officials. Specific Pick Up Points will be determined when the special needs evacuation orders are given.

Call 2-1-1 and register every year if you will need bus transportation
One piece of luggage per person. Have ID and any medications.

Emergency Information

CAMERON COUNTY

- **County Emergency Management**
  956-547-7000
- **Sheriff's Office**
  956-544-0860*
- **Brownsville Emergency Management**
  956-504-7405
- **Harlingen Emergency Operations Center**
  956-216-5920
- **San Benito Emergency Operations Center**
  956-361-3822
- **Port Isabel Emergency Operations Center**
  956-943-2727
- **Town of South Padre Island Emergency Management**
  956-433-9720
  1-800-OKPADRE (Emergency)*

HIDALGO COUNTY

- **County Emergency Management**
  956-318-2615
- **Sheriff's Office**
  956-393-6000*
- **McAllen Emergency Management**
  956-681-1234
- **Mission Emergency Operations Center**
  956-580-8705
- **Edinburg Emergency Management**
  956-292-2001
- **Pharr Emergency Management**
  956-787-7541
- **Weslaco Emergency Management**
  956-968-0367

JIM HOGG COUNTY

- **County Emergency Management**
  361-527-4100

** 24 hour number*

WILLACY COUNTY

- **County Emergency Management**
  956-689-5456
- **Sheriff's Office**
  956-689-5577*

KENEDY COUNTY

- **County Emergency Management**
  361-595-8527
- **Sheriff's Office**
  361-294-5205*

BROOKS COUNTY

- **County Emergency Management**
  361-675-0158
- **Sheriff's Office**
  361-325-3697*

STARR COUNTY

- **County Emergency Management**
  956-227-0666
- **Sheriff's Office**
  956-487-5571*

ZAPATA COUNTY

- **County Emergency Management**
  956-765-9942
- **Sheriff's Office**
  956-765-9960*

Additional Information

US Department of Homeland Security
www.ready.gov

National Red Cross
www.redcross.org

FEMA
www.fema.gov

Community Resource Information:
Do Not Call 911 for Non-Emergencies!

211 TEXAS
Connecting People and Services

Returning Home

IF YOU EVACUATED THE AREA, WAIT FOR AN ALL CLEAR FROM THE CITY OR COUNTY BEFORE ATTEMPTING TO RETURN TO YOUR HOME. BE PREPARED TO SHOW PROOF OF RESIDENCE BY HAVING A COPY OF YOUR LATEST UTILITY BILL.

FEMA News Photo

General Cleanup

- Be cautious of structural damage and downed power lines. Do not attempt to move structural supports or large pieces of debris.
- DO NOT run power generators indoors. Inhalation of carbon monoxide from the exhaust can cause death. Ensure exhaust is well ventilated.
- DO NOT use open flames indoors.
- Restrict your driving to emergency use only. Road conditions may not be safe until road debris is cleared.

Debris Cleanup

- Cities and counties will publish a schedule for debris pick-up and removal. Debris cannot be removed from private property.
- Construction materials, vegetative debris, household hazardous waste and household appliances will need to be placed into separate piles and moved to the curbside for pick-up.

FEMA News Photo

FEMA News Photo

Water

- Listen for instructions regarding public water supply. Use only bottled, boiled or treated water until you know that your water supply is safe.
- You can use household chlorine bleach to treat water for drinking or cleaning. Add 1/8 teaspoon of bleach per gallon of clear water or 1/4 teaspoon of bleach per gallon if water is cloudy. Allow water to stand for 30 minutes before using.

Returning Home

Utility Cleanup

FEMA News Photo

- Check for gas leaks. If you smell or hear gas leaking, leave immediately. DO NOT use the phone or turn on lights in your home. Call the gas company from a neighbor's phone.
- Report any visible damage of power lines to the electric company. Turn off power at main breaker if any electrical equipment or circuits have been exposed to water.
- DO NOT connect generators to your home's electrical circuits. If a generator is on line when electrical service is restored, it can become a major fire hazard. Also, line workers working to restore power will be endangered if a generator is hooked up to the home's circuits.
- It is likely that an electric company other than your own will reconnect the lines to your home; however, they can not turn the service back on. Only your electric company can actually turn the power back on to your house.

Sewage Cleanup

- If you suspect water or sewage lines are damaged, do not use your plumbing (toilets, sinks, etc.). Contact the water company or a plumber for repairs.
- A chemical portable commode can be created by the following:
  - ✓ Use 5 gallon buckets with tight lids, lined with heavy duty plastic garbage bags.
  - ✓ Add kitty litter to the bucket as a disinfectant and deodorizer. Keep lids on firmly.
  - ✓ Keep buckets in a cool, dark place. Clean and disinfect buckets immediately.
- Your toilet can also be used by flushing until the bowl has no water. Then, line with heavy duty trash bags and disinfect with chlorine bleach after each use. Remove waste to an outside location.
- If significant sewer outages have occurred, instructions for disposal of human wastes will be announced.
- DO NOT dispose of human waste through your regular trash!

Interior Cleanup

- Disinfect and dry interior buildings and items inside. This will prevent growth of some bacteria, viruses, mold, and mildew that can cause illness.
- Clean walls, floors, and counter tops with soap and water. Disinfect them with a solution of 1 cup of bleach to 5 gallons of water.
- Wash all clothes and linens in hot water. Air dry and spray all unwashable items with disinfectant. Steam clean carpets. Throw away all items touched by water that cannot be disinfected.

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